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SOURCE Stratostat-Parashyut, Gidrometeoizdat.

REVIEW OF "THE STRATOSTAT-PARACHUTE"
BY ENGINEER S. V. REVZIN

This pamphlet gives some historical data on parachute-like descents of free aerostats of the usual type and design; construction data on the USSR's first "stratostat-parachute" stratosphere balloon, with a description of its flight and ultimate destruction by fire; and information on stratospheric observations accomplished in this flight.

After a brief historical review of stratosphere and substratosphere flights, the technical details and construction of the stratosphere balloon, the SP-2, such as falling speed, size, hydrostatic efficiency, etc., are discussed. Aerostat AP-1, a model balloon built to check theoretical conclusions, is described. The structural characteristics of the SP-2 -- envelope, suspension system, starting belt, gas valve, shaft, curvilinear appendices, etc. -- are then described.

A separate chapter is devoted to the construction of the gondola, of the following dimensions: volume 4.85 cubic meters, diameter 2.1 meters, height 2.6 meters, and weight 250 kilograms. The gondola provided for: a minimum pressure of 500 millimeters Hg minimum pressure; oxygen content in the air of about 25 percent for a minimum partial pressure of 125 millimeters; permissible carbon dioxide content, 15 millimeters; relative humidity, about 85 percent. Soda lime was used as a carbon dioxide absorbent in the air-purification unit. The oxygen supply unit could deliver 8,000 liters of gaseous oxygen at normal atmospheric pressure. (The section on gondola equipment was taken from V. A. Spasskiy's book Physiologico-Hygienic Provisions for Stratospheric Flights. Spasskiy, a specialist in aviation medicine, took part in the organization of the SP-2 flight.) The gondola was also equipped with a short-wave radio, two altimeters (12 and 30 kilometers); and special instruments from the Academy of Sciences for observations on cosmic radiation and polarization of light and air composition at various levels.

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Two test flights over Moscow were made in the AP-1 (first test model) in October 1935. On both these flights, a height of about 5,000 meters was reached. The AP-2 (second test model) made flights in August 1937 and September 1938, reaching 4,600 meters in the first flight and 3,100 meters in the second. Both test models were designed, as was the SP-2, by T. M. Kulichenko.

Stratostat SP-2 was finished early in 1938 and registered as an airship by the Civil Air Fleet with the identification numbers "SSSR VR 60." A number of substratosphere flights were made late in 1938 in preparation for the SP-2 flight. Preflight preparations were conducted from 16 July to 7 August 1939. After one false start on 2 October, the balloon was launched near Moscow on 12 October. The night before the flight, 11 pibals were released in the area for weather reconnaissance. Two rasondes were also released, reaching 11,000 meters. The SP-2 (crew: A. A. Fomin, M. I. Volkov, and A. F. Krikun) reached 16,000 meters and stayed there for 2 hours and 33 minutes. The balloon, however, caught fire on the descent at about 8,000 meters and the crew was forced to parachute out. All flight documents and records of scientific observations were saved.

Despite the SP-2's special sharp-pointed discharge rod with a radioactive polonium disk, the fire was doubtlessly due to an electrical discharge in the envelope. At any rate, stratosphere balloons should, henceforth, be filled with helium instead of hydrogen.

As for scientific results, observations on cosmic rays in this flight and substratosphere flights in 1940 indicate certain defects in the cascade theory of interaction of cosmic rays with matter. A spectrograph of six films was obtained for the Institute of Theoretical Geophysics of the Academy of Sciences. Seven air samples were taken in flight, but were lost and not found until 2 months later. A Geiger-Muller counter with lead shield (35 x 35 x 0.8 centimeters) 12 centimeters from the counter was used in the cosmic-ray observations.

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